

delivering an encapsulant to a cavity defined by the support, the microelectronic device, and a peripheral dam carried by the lead frame, the encapsulant bonding the microelectronic device to the lead frame; removing the support, leaving the back surface of the microelectronic device exposed; and cutting the lead frame to separate a plurality of electrically isolated lead fingers from the peripheral dam;

electrically coupling a first one of the microelectronic device assemblies to a substrate;

electrically coupling the lead fingers of a second one of the microelectronic device assemblies to the lead fingers of the first microelectronic device assembly with a back surface of the lead fingers of the second microelectronic device assembly being coupled to a front surface of the lead fingers of the first microelectronic device assembly, defining a gap between the exposed back surface of the microelectronic device of the second microelectronic device assembly and a front surface of the first microelectronic device assembly; and

applying an electrically insulative covering over a front surface of the lead fingers of the second microelectronic device assembly.

2. The method of claim 1 wherein cutting the lead frame comprises cutting the lead frame within a periphery defined by the peripheral dam.
3. The method of claim 1 wherein assembling each microelectronic device assembly further comprises positioning an upper mold element against an upper surface of the lead frame prior to delivering the encapsulant.
4. The method of claim 1 wherein the upper mold element, the peripheral dam, and the exposed surface define a mold for the encapsulant.
5. The method of claim 3 wherein an upper surface of the encapsulant is aligned with the upper surface of the lead frame.

6. The method of claim 1 wherein electrically coupling the microelectronic device to the lead frame comprises coupling an active surface of the microelectronic device to the lead frame by a plurality of bond wires.

7. The method of claim 6 wherein an upper surface of the encapsulant is aligned with the upper surface of the lead frame and the bond wires are encapsulated in the encapsulant.

8. The method of claim 1 wherein removing the support exposes a lower surface of each of a plurality of lead fingers.

9. The method of claim 1 wherein removing the support exposes a lower surface of each of a plurality of lead fingers, the exposed lower surfaces being peripherally aligned.

10. The method of claim 1 wherein the lead frame includes a plurality of lead fingers extending inwardly from the peripheral dam, the encapsulant being permitted to flow between the support and at least some of the lead fingers.

13. A method of assembling a microelectronic device assembly including a microelectronic die and a plurality of electrically independent lead fingers, comprising:

releasably attaching a support to a back surface of a lead frame and to a back surface of a microelectronic die, the lead frame including a front surface spaced from the back surface and an opening extending from the front surface to the back surface, the opening having an inner periphery defined by an outer member and a plurality of L-shaped lead fingers extending inwardly from the outer member, the die being positioned in the opening with a periphery of the die spaced inwardly of at least part of the inner periphery of the opening to define a first peripheral gap;

electrically coupling the die to the lead fingers with a plurality of bonding wires;

filling the opening above the support with an encapsulant, the encapsulant entering the peripheral gap and attaching the lead frame to the die;

removing excess encapsulant deposited on front surfaces of any of the lead fingers; and

removing the support, leaving the back surface of the die exposed and leaving a back surface of each of the L-shaped lead fingers exposed, each lead finger thus having an exposed back surface that is larger than the front surface.

14 ¹³ ~~12~~. The method of claim ¹³ ~~12~~ further comprising separating the lead fingers from the outer member.

¹⁵ ~~14~~. The method of claim ¹³ ~~12~~ further comprising cutting the outer member from the lead frame, yielding a plurality of independent lead fingers connected to one another only by the encapsulant and by the bonding wires via the die.

¹⁶ ~~15~~. The method of claim ¹³ ~~12~~ wherein the support comprises an adhesive tape, the lead frame and the die being releasably adhered to the adhesive tape and the adhesive tape forming a seal against the back surface of the lead frame and the back surface of the die to retain the first encapsulant.

¹⁷ ~~16~~. The method of claim ¹³ ~~12~~ further comprising cutting the lead frame to separate the lead fingers from the outer member.

¹⁸ ~~17~~. The method of claim ¹³ ~~12~~ wherein the support is a first support, the lead frame is a first lead frame, the microelectronic die is a first microelectronic die, the outer member is a first outer member, the lead fingers are first lead fingers, the bonding wires are first bonding wires, and the encapsulant is a first encapsulant, the method further comprising:

releasably attaching a second support to a back surface of a second lead frame and to a back surface of a second microelectronic die, the second lead frame including a front surface spaced from the back surface and an opening extending from the front surface to the back surface, the opening having an inner periphery defined by a second outer member and a plurality of second lead fingers extending inwardly from the second outer

member, the second die being positioned in the opening with a periphery of the second die spaced inwardly of at least part of an inner periphery of the opening to define a second peripheral gap;
electrically coupling the second die to the second lead fingers with a plurality of second bonding wires;
filling the opening above the second support with a second encapsulant, the second encapsulant entering the second peripheral gap and attaching the second lead frame to the second die;
removing the second support, leaving the back surface of the second die exposed and leaving the back surface of the second lead frame exposed;
and
electrically coupling one of the first lead fingers to one of the second lead fingers.

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The method of claim 17 wherein a plurality of the first lead fingers are electrically coupled to a plurality of the second lead fingers.

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The method of claim 17 further comprising separating the first lead fingers from the first outer member and separating the second lead fingers from the second outer member.

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The method of claim 19 wherein the first lead fingers are separated from the first outer member by cutting the lead frame prior to electrically coupling the first and second lead fingers.

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The method of claim 19 wherein the first and second lead fingers are separated from the first and second outer members prior to electrically coupling the first and second lead fingers.

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The method of claim 17 wherein electrically coupling the first and second lead fingers spaces the second die from the first encapsulant to define an intercomponent gap between the second die and the first encapsulant.

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The method of claim 17 wherein the first lead finger is electrically coupled to the second lead finger by electrically coupling a front surface of the first lead finger to a back surface of the second lead finger.

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A stacked microelectronic device assembly, comprising:

a first subassembly having a first thickness and comprising a plurality of electrically independent first lead fingers, a first die, and a first encapsulant bonding the first die to the first lead fingers, each of the first lead fingers having a thickness equal to the first thickness and defining an exposed front contact and an exposed back contact, the first die having an exposed back surface and being electrically coupled to the plurality of first lead fingers by a plurality of first bonding wires;

a second subassembly having a second thickness and comprising a plurality of electrically independent second lead fingers, a second die, and a second encapsulant bonding the second die to the second lead fingers, each of the second lead fingers having a thickness equal to the second thickness and defining a front contact and an exposed back contact, the second die having an exposed back surface and being electrically coupled to the plurality of second lead fingers by a plurality of second bonding wires;

a plurality of electrical connectors, each of which electrically couples the exposed front contact of one of the first lead fingers to the exposed back contact of one of the second lead fingers; and

an electrically insulative covering over the exposed front contacts of the second lead fingers.

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The stacked microelectronic device assembly of claim 25 wherein an intercomponent gap is defined between the first and second subassemblies.

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The stacked microelectronic device assembly of claim 25 further comprising a substrate, the first subassembly being attached to a mounting surface of the substrate.

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38. The stacked microelectronic device assembly of claim ~~25~~ ²² wherein the exposed back contacts of at least two of the first lead fingers are electrically coupled to the substrate.

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39. The method of claim 1 wherein the gap is a first gap, the method further comprising filling a second gap between the first microelectronic device assembly and the substrate with an underfill material.

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40. The method of claim ~~39~~ ¹¹ further comprising cooling the microelectronic device of the second microelectronic device assembly by exposing the back surface thereof to the intercomponent gap.

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43. (New) The method of claim 1 wherein removing the support exposes a lower surface of each of a plurality of lead fingers, the exposed lower surfaces of the lead fingers being staggered with respect to one another.

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44. (New) A method of assembling a microelectronic device assembly, comprising: releasably attaching a back surface of a microelectronic device to a surface of a support;

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thereafter, releasably attaching a lead frame to the support, the lead frame having a thickness and having an opening passing through the thickness, the microelectronic device being disposed in the opening and a portion of the surface of the support being exposed to the opening;

electrically coupling the microelectronic device to the lead frame;

delivering an encapsulant to a cavity defined by the support, the microelectronic device, and a peripheral dam carried by the lead frame, the encapsulant bonding the microelectronic device to the lead frame; and

removing the support, leaving the back surface of the microelectronic device exposed.

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45. (New) The method of claim ~~44~~ ³⁰ wherein a plurality of microelectronic devices are releasably attached to the surface of the support and the lead frame has a plurality of the openings, releasably attaching the lead frame to the support

comprising positioning one of the microelectronic devices in each of the openings.

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